

**DESCRIPTIONS OF NYMPHS OF THE DELPHACID  
PLANTHOPPER *PISSONOTUS DELICATUS*  
(HOMOPTERA: FULGOROIDEA)**

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*Abstract.*—First, third, fourth and fifth instar nymphs of *Pissonotus delicatus* Van Duzee collected from camphorweed (*Heterotheca subaxillaris* (Lam.) Britt. and Rusby: Asteraceae) in Florida are described and illustrated. Features useful in separating nymphal instars include differences in body size and proportions; spination of metatibiae, metatibial spurs, and metatarsomeres; and number of metatarsomeres and body pits.

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*Pissonotus delicatus* Van Duzee is one of the most widely distributed of the 30 species of the North American planthopper genus *Pissonotus*, having been recorded from New York south to Florida and west to Utah, Texas, Oregon, and California (Beamer, 1952; Morgan and Beamer, 1949; Oman and O'Brien, pers. comm.). This delphacid has been collected on several composites: *Grindelia* sp. in Arizona (Morgan and Beamer, 1949), *G. squarrosa* (Pursh) Dunal. in Utah (Oman and O'Brien, pers. comm.), and *Haplopappus ciliatus* (Nutt.) DC in Kansas (Morgan and Beamer, 1949); the subspecies *P. d. melanurus* Van Duzee was collected on *G. camporum* Greene in California (Morgan and Beamer, 1949). Adults were described and male genitalia illustrated by Morgan and Beamer (1949) who noted considerable variability in the shapes and dentition of the aedeagal processes. This morphological variability and the different host affinities suggest that *P. delicatus* may represent a complex of sibling species. No other published information is available on the biology or immatures of this species.

This paper presents descriptions and illustrations of nymphs of *P. delicatus* collected on camphorweed, *Heterotheca subaxillaris* (Lam.) Britt. and Rusby (Asteraceae) in Florida.

DESCRIPTIONS

Specimens were preserved in 70% ethyl alcohol. The 5th instar is described in detail but only major differences are described for preceding instars. Measurements are given in mm as mean  $\pm$  SD. Length was measured from apex of vertex to terminus of abdomen, thoracic length along the midline from anterior margin of the pronotum to posterior margin of the metanotum, and width across the widest part of the body. One specimen of each nymphal instar was cleared in 6% KOH in order to examine distribution and number of body pits.

The collection data of specimens used for description are: FLORIDA: Broward Co., Fort Lauderdale, 11 September 1985, coll. P. Calvert. ex. camphorweed (8 adult

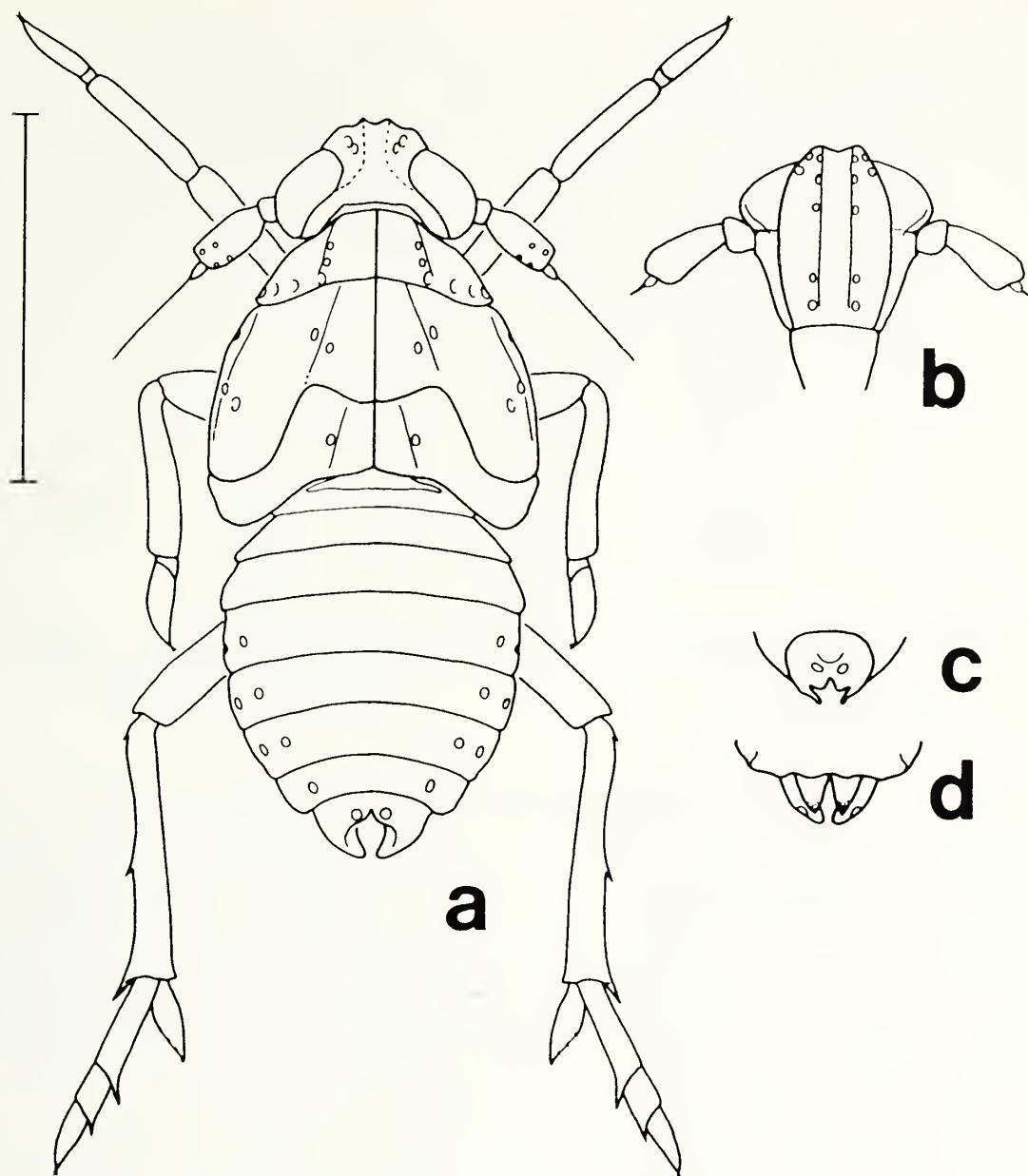


Fig. 1. *P. delicatus* fifth instar. A. Habitus. B. Frontal view of head. C. Ventral view of apex of abdomen of male. D. Ventral view of apex of abdomen of female. Bar = 1 mm.

males, 8 females; 10 fifth instar nymphs; 10 fourth instars, 8 third instars, 5 first instars). The male aedeagal process was identical to that of a Florida specimen illustrated by Morgan and Beamer (1949:fig. 24h). One third instar was stylopized, probably by a species of *Elenchus* (Strepsiptera: Elenchidae) (Borror et al., 1989; Kathirithamby, 1978).

*Fifth instar* (Figs. 1, 3D). Length  $2.2 \pm 0.33$ ; thoracic length  $0.7 \pm 0.06$ ; width  $0.9 \pm 0.09$ .

Form elongate, subcylindrical, slightly flattened dorsoventrally, widest across mesothoracic wingpads. Body whitish; anterior aspect of antennae and apices of pro- and mesotarsi brown (in alcohol).

Vertex quadrate, length subequal to width at base, posterior margin convex; carina on each side extending anteromedially from inner margin of compound eye and continuing onto frons as inner carina. Frons subrectangular; widest in middle, width

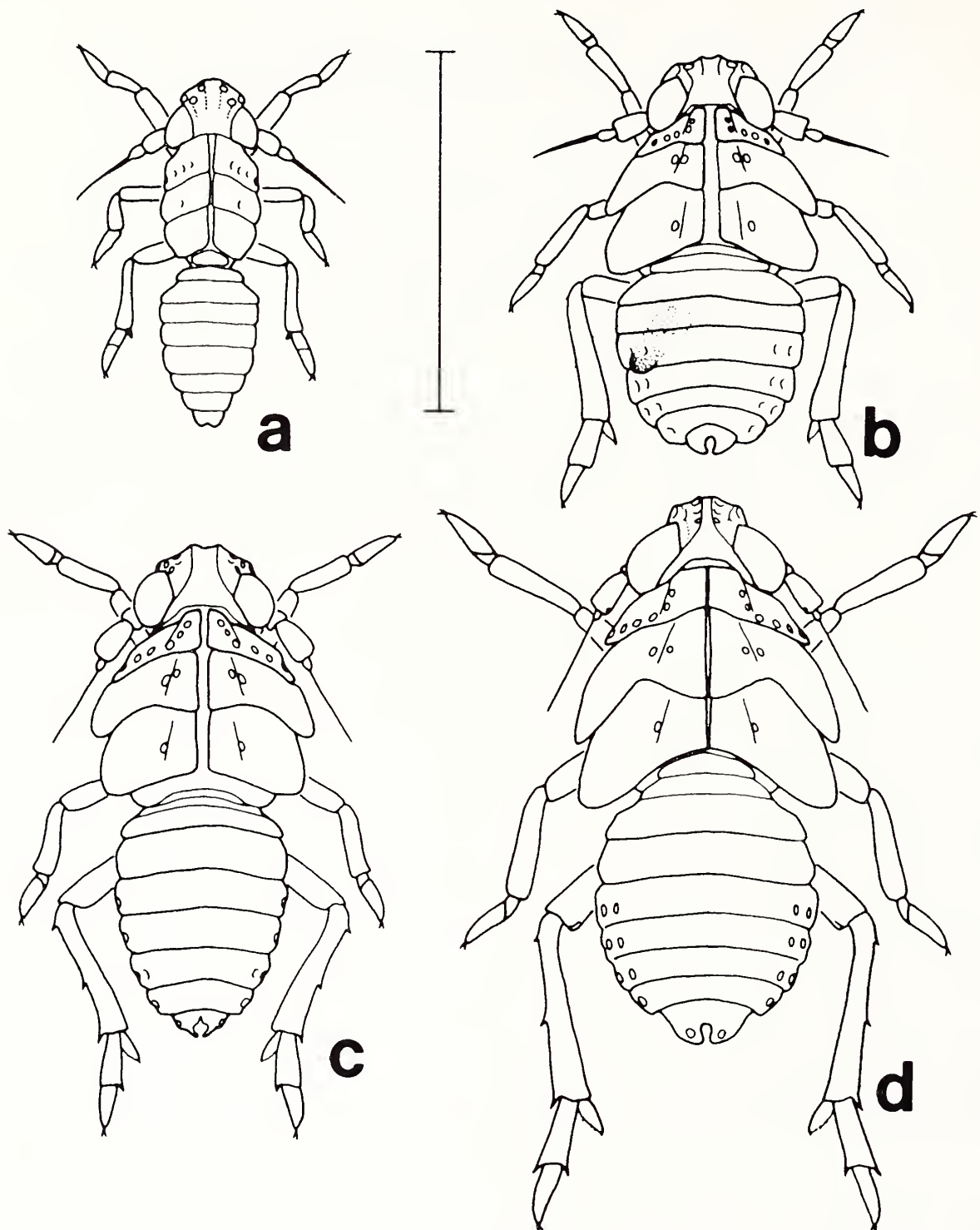


Fig. 2. *P. delicatus* nymphs. A. First instar. B. Stylopized third instar. C. Third instar. D. Fourth instar. Bar = 1 mm.

ca.  $0.67 \times$  length; carinate lateral margins slightly convex, these outer carinae extending from vertex to near clypeal border and paralleled by pair of straighter inner carinae; 9 pits between each inner and outer carina (2 of these pits on dorsal aspect) and 4 pits between each outer carina and eye. Clypeus narrowing distally, consisting of subconical basal postclypeus and cylindrical distal anteclypeus. Beak extending to metatrochanters; 3-segmented, segment 1 obscured by anteclypeus, segment 2 slightly longer than 3; apex of segment 3 dark brown. Eyes red. Antennae 3-segmented; scape cylindrical, length subequal to width; pedicel subcylindrical, ca.  $3 \times$  longer than wide

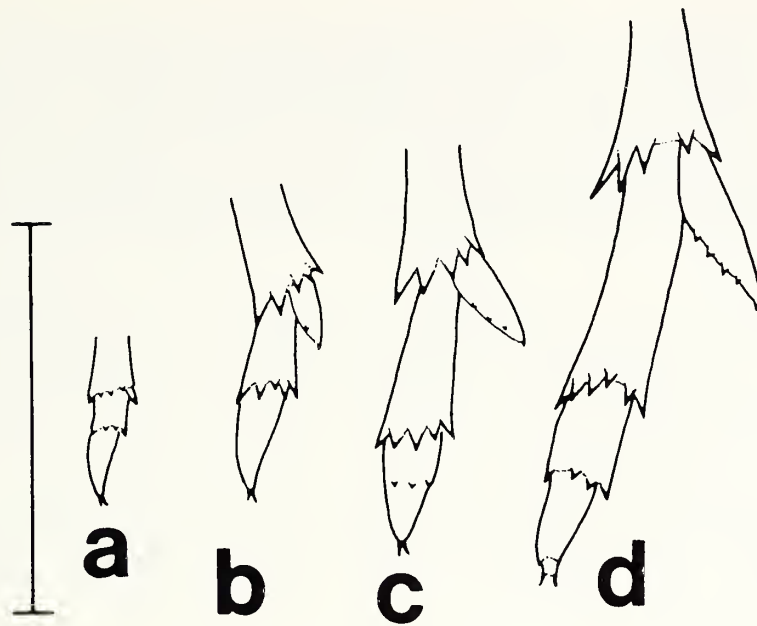


Fig. 3. *P. delicatus* apices of metathoracic legs, plantar surface. A. First instar. B. Third instar. C. Fourth instar. D. Fifth instar. Bar = 0.5 mm.

and ca.  $3\times$  length of scape, with 10–12 pitlike sensoria; flagellum bulbous basally, with elongate, bristle-like extension distally, bulbous base ca.  $0.15\times$  length of pedicel.

Thoracic nota divided by middorsal line into three pairs of plates. Pronotal plates subrectangular; anterior margin following posterior margin of head, posterior border sinuate; each plate with straight posterolaterally directed carina originating on anterior margin in median  $\frac{1}{3}$  and terminating in middle of plate, carina bordered along inner margin by row of 7 pits extending posterolaterally to lateral border of plate (lateralmost pits not visible in dorsal view). Mesonotal median length ca.  $1.5\text{--}2\times$  that of pronotum; each plate bearing an elongate lobate wingpad covering lateral half of metanotal wingpad; with posterolaterally directed carina originating on anterior margin in median  $\frac{1}{4}$  and terminating on posterior margin; 2 pits, one on each side of carina and 3 pits in lateral  $\frac{1}{3}$ . Metanotal median length ca.  $0.5\text{--}0.75\times$  that of mesonotum; each plate bearing an elongate lobate wingpad extending to tergite 3; with weak longitudinal carina originating on anterior margin in median  $\frac{1}{4}$  and terminating near posterior margin; 1 pit just lateral to carina. Pro- and mesocoxae elongate, posteromedially directed; metacoxae fused to sternum. Metatrochanters subcylindrical, each with row of many minute teeth on posteromedial aspect which interlocks with those on the adjoining trochanter. Metatibia with 2 black-tipped spines on lateral aspect of shaft, an apical transverse row of 5 black-tipped spines on plantar surface and a subtriangular, flattened movable spur with row of 4–6 teeth on lateral aspect and 1 terminal tooth (Fig. 3D). Pro- and mesotarsi with 2 dark brown tarsomeres; tarsomere 1 wedge-shaped; tarsomere 2 subconical, curved, and with pair of apical claws and median membranous pulvillus. Metatarsi with 3 tarsomeres; tarsomere 1 cylindrical with apical transverse row of 5–7 black-tipped spines on plantar surface; tarsomere 2 cylindrical, ca.  $0.25\times$  length of tarsomere 1, with apical transverse row of 4 black-tipped spines on plantar surface; tarsomere 3 subconical, similar to terminal tarsomere of other legs.

Abdomen 9 segmented; slightly flattened dorsoventrally, widest across segments 4 and 5. Tergites 1 and 2 reduced; tergites 5–8 each with 3 pits on either side of midline (lateralmost pits not always visible in dorsal view). Segment 9 surrounding anus; with 3 pits on each side; female with 1 pair of subacute processes extending caudally from juncture of sternites 8 and 9; males lacking processes (Fig. 1C, D).

*Fourth instar* (Figs. 2D, 3C). Length  $1.5 \pm 0.05$ ; thoracic length  $0.6 \pm 0.03$ ; width  $0.6 \pm 0.02$ .

Antennal pedicel ca.  $2 \times$  longer than wide and ca.  $2 \times$  length of scape, with 6–8 pitlike sensoria; bulbous portion of flagellum ca.  $0.25 \times$  length of pedicel.

Mesonotal wingpads shorter. Metatibial spur convex on both sides, with row of 1–3 teeth on lateral aspect and 1 terminal tooth. Metatarsi with 2 tarsomeres; tarsomere 1 with apical transverse row of 6 black-tipped spines on plantar surface; tarsomere 2 subconical, similar to terminal tarsomere of other legs, partially subdivided in middle, with transverse row of 3 very weak black-tipped spines in middle on plantar surface.

Abdominal subacute processes of female not apparent.

*Third instar* (Figs. 2B, C, 3B). Length  $1.3 \pm 0.05$ ; thoracic length  $0.5 \pm 0.02$ ; width  $0.5 \pm 0.01$ .

Antennal pedicel with 4 very weak pitlike sensoria; bulbous portion of flagellum ca.  $0.33 \times$  length of pedicel.

Mesonotal median length slightly longer than those of pro- and metanota; wingpads weakly developed, covering metanotal wingpad laterally at base. Metatibial spur with 1 tooth on lateral aspect and 1 apical tooth. Metatarsomere 1 with apical transverse row of 5 black-tipped spines on plantar surface; tarsomere 2 lacking spines in middle. A stylopized third instar is illustrated in Figure 2B.

*First instar* (Figs. 2A, 3A). Length  $0.9 \pm 0.03$ ; thoracic length  $0.2 \pm 0.02$ ; width  $0.2 \pm 0.02$ .

Body pits very obscure.

Antenna with bulbous portion of flagellum ca.  $0.5 \times$  length of pedicel.

Metatibia lacking lateral spines on shaft; apical transverse row of 4 black-tipped spines on plantar surface; spur weakly developed, slightly longer than longest tibial spine. Metatarsomere 1 with apical transverse row of 4 black-tipped spines on plantar surface.

#### ACKNOWLEDGMENTS

We thank Dr. Paul Oman, Department of Entomology, Oregon State University, Corvallis, and Dr. Lois O'Brien, Department of Entomology, Florida A&M University, Tallahassee, for host information and specimens from Utah and appreciate the helpful suggestions of Drs. O'Brien and Frank Mead, Florida Department of Agriculture, Gainesville. We thank Mr. Paul Calvert, Pettis County Soil Conservation Service, Sedalia, Missouri, for collecting specimens. This paper is Journal Series No. R-00577 of the Florida Agric. Exp. Stn.

#### LITERATURE CITED

- Beamer, R. H. 1952. One old and five new species of delphacine fulgorids (Homoptera-Fulgoridae). *J. Kansas Entomol. Soc.* 25:111–115.

- Borror, D. J., C. A. Triplehorn and N. F. Johnson. 1989. An Introduction to the Study of Insects, 6th Edition. Saunders College Publ., Philadelphia, 875 pp.
- Kathirithamby, J. 1978. The effects of stylopisation on the sexual development of *Javesella dubia* (Kirschbaum) (Homoptera: Delphacidae). Biol. J. Linn. Soc. 10:163-179.
- Morgan, L. W. and R. H. Beamer. 1949. A revision of three genera of delphacine fulgorids from America north of Mexico (Homoptera-Fulgoridae-Delphacinae). J. Kansas Entomol. Soc. 22:97-120, 121-142.

Received 28 March 1990; accepted 3 July 1990.